

#### 4.12 Logarithmic Functions (Key-odds)

1.  $(0, \infty)$

3. 1

5. True

7.  $\log_a 1.6 = 2$

9.  $\ln M = 2.2$

11.  $a^6 = 3$

13.  $e^4 = x$

15. -4

17.  $\frac{1}{2}$

19.  $(10, \infty)$

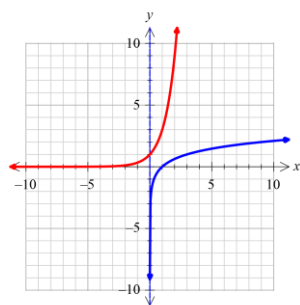
21.  $(0,1) \cup (1,\infty)$

23. 2.303

25.

x	f(x)
-1	1/3
0	1
1	3

x	f <sup>-1</sup> (x)
1/3	-1
1	0
3	1



27. a)  $(-4, \infty)$  b) see graph c) Range:  $(-\infty, \infty)$ ;  $x = -4$  d)  $f^{-1}(x) = e^x - 4$  e) Domain:  $(-\infty, \infty)$  Range:  $(-4, \infty)$

f) see graph

33.  $x = 2$

35.  $x = -1$

37.  $x = \ln(5/4) - 1$

